APPLICATION OF WAGE INCENTIVES
TO
ORDER FILLING AND SHIPPING OPERATIONS

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Walter Joseph Meditz

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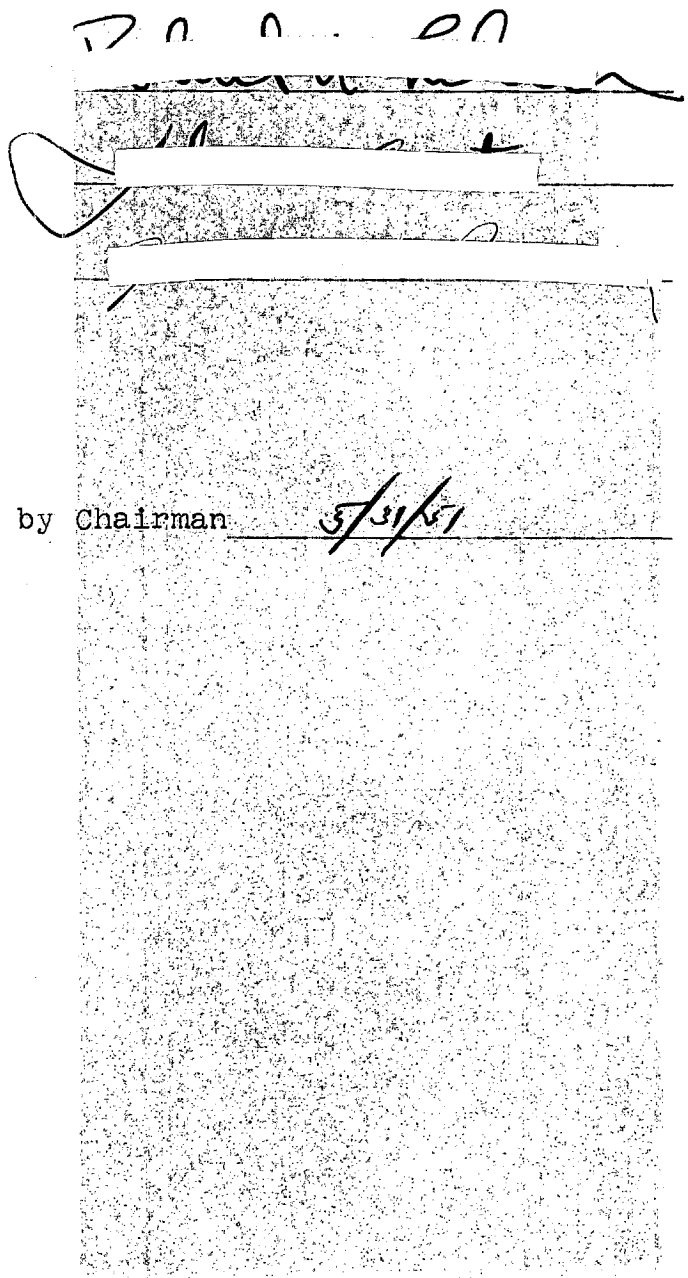

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APPLICATION OF WAGE INCENTIVES TO ORDER FILLING AND SHIPPING OPERATIONS

INTRODUCTION

Competitive industry today is looking with a new and sales-minded interest into two aspects of the distribution of its products: the speed and the cost of handling a customer's order in the office and the shipping department. These factors are recognized as part of the manufacturer's ubiquitous problem of obtaining the best possible relationship between the company and the customer.

Thus, the time interval between the receipt of the customer's order and its shipment is important because the faster the order can be shipped, the sooner a repeat order may be expected. The cost of handling an order is significant because handling expense is a highly variable factor in the distribution cost. Any savings realized here can be used, for example, in advertising which will increase the company's sales volume and in turn hasten the customer's product turnover.

To obtain the lowest possible cost of handling and the shortest processing time per order, it is necessary to have a good system for handling orders and a sound wage incentive to encourage optimum operation of such a system.

I shall focus my attention on the motivation of the efforts of the shipping department personnel only, omitting the problem of office personnel from the present study.

I believe these shipping department employees should be paid on the basis of the energy expended, rather than on the physical number of hours spent on the job. A sound wage incentive system is therefore suggested with the primary purpose of securing low cost per order while equitably rewarding the employees.

I shall emphasize the coordination between office and shipping department which is necessary to carry out the wage incentive plan successfully, since a minimum of employee-employer friction is admissible in time lost hunting out-of-stock items, or resulting from errors on shipping invoices, etc.

This study of the application of a wage incentive plan to the handling of orders will be discussed in four general directions:

I An outline of the essentials of a good wage incentive system;

II An outline and discussion of the office and shipping department functions in handling an order, and suggested layouts for a shipping department;

III An outline of inventory control and its relation to an incentive system;

IV A detailed outline of a specific wage incentive plan for order filling and shipping operations.

The discussion of wage incentives, including office functions, inventory control, and necessary office and shipping coordination, will be treated so generally as to be applicable to companies shipping many different types of product. Thus, a warehouse for distribution of small items such as watches and watch parts would basically require the same over-all procedure as one shipping a complete line of paints and allied products. The same general ideas on wage incentives could be followed, but every study would require its own time study data to calculate the standard time data.

For purposes of illustration of a wage incentive system, the Boyle-Midway, Inc., Chamblee plant was used since this is a fairly standardized type of operation.

REVIEW OF THE LITERATURE

A thorough bibliographical search on the subject of incentives for shipping department produced one article by C. Mors and F. Prochaska.[1] In this article all merchandise shipped was divided into classes, and average time study readings were determined for the workers handling each class. A better procedure would be to make actual time studies for workers handling each item or small group of items in each class. The average time values can introduce sizeable errors

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[1] Mors, D, and Prochaska, F, "Packing and Shipping on Incentives," Mill and Factory, October, 1948, pp.140-2.

in the final incentive. The weight of each item, the location of the item, and its geographical location with respect to another were not considered by these authors, factors which will also influence a time study reading for standard data for a wage incentive system. This article did not discuss the necessary office and shipping department coordination nor the existing condition under which the wage incentive was installed.

The search included a study of Industrial Arts Index 1940-1951, published by H. W. Wilson Company; Engineering Index 1940-1951, published by Engineering Index Inc.; and Bibliography of Industrial Engineering and Management Literature by Ralph M. Barnes and Norma A. Englert, published by Wm. C. Brown Co. Probably a great deal of work has been done on this subject, but the consulting engineers have been reluctant to release the results.

DEFINITION OF TERMS USED

Time study is the process of accurately determining the time required by a qualified person working at a normal pace to do the task in the trained, standardized, most economical way.

Guaranteed base rate is the rate of hourly pay granted the worker who is on non-incentive work. It is also the minimum guaranteed hourly earnings of the incentive operator and is the rate at which he is paid during unavoidable idle time.

Normal refers to the rate of movement on the operator's part which is indicative of natural body movements free of waste motion. It assumes that the operator is trained and qualified to perform the job in question.

Productive effort refers to the actual rate of movement exerted by the operator, stated in terms of normal. For example, when 100% denotes normal productive effort, a productive effort of 125% would represent a rate of productive movement 25% faster than normal.

ESSENTIALS OF A GOOD WAGE INCENTIVE SYSTEM

Whenever conditions and methods have been improved as far as appears practical and economical, then and only then is management ready to adopt a wage incentive system suitable for each job. A good incentive plan is one that benefits the employees as well as the employer.

The conventional wage incentive plan is designed to compensate the employee in proportion to his output when the incentive standards are exceeded. The incentive standard is set at output per unit of time that can be expected when a qualified, trained employee is performing his task with normal productive effort. There also is provided in the standard sufficient allowance for fatigue, personal time, and minor unavoidable interruption. The plan specifies that the employee is guaranteed his basic hourly rate for the actual hours spent on incentive work on days for which work output

falls below the incentive standard. The standard also specifies that the employee will be taken off standard during major unavoidable interruptions, such as waiting for material, waiting for orders, etc. During the off-standard hours, the employee is paid on the basis of his guaranteed hourly pay rate.

In the wage incentive system there is enough spread between the guaranteed base rate and the normal bonus rate to provide incentive to extra effort or sustained effort. The guarantee of the standards provides enough to give the worker a feeling of security.

Whenever a wage incentive system is installed which is radically different from the existing hourly pay rate, there is definite need to provide adequate instruction to all employees as to policy and methods. At all times the plan should be rigidly maintained.

The essentials of a good wage incentive are incorporated either in part or as a whole in the various existing systems. The vast majority of incentives presently in industry come in their fundamentals under one of the following plans: Standard Hour Plan, Point Plans typed by the Bedaux System, Straight Piece Work, the 50-50 Premium Plan (Halsey), or Measured Day Work.

I feel that of the five groups of systems, the Standard Hour Plan (see Figure 1) incorporates all the requirements of a sound wage incentive. The outstanding features

of the Standard Hour Plan are that the worker receives 100% of the bonus earned and that the system is easily understood by the worker.

It is possible to forcast the savings which might be realized by the installation of such a plan, but the actual savings will vary with the percent production attained by the working personnel. Whenever a sound incentive has been installed, there has been a sizeable saving to the company. Wages increase, but production also shows a marked increase.

OFFICE AND SHIPPING FUNCTIONS IN HANDLING AN ORDER

An office routine is necessary for handling the orders so that coordination between the office and the shipping department may be so well established as to permit installation of an effective wage incentive system. The office procedure must be such that it permits the most economical and standardized method for handling the orders in the shipping department.

Examination of the office procedure for handling an order is therefore pertinent to the setting up of a wage incentive for the shipping department. We are interested in the receipt of the order, the checking of inventory control records, the billing of invoices, and the routing of the shipment with the bill of lading.

A customer's order is received in a plant for shipment through one of the following channels: by written order from

the sales department; by telephone, telegraph, or mail directly from the customer. Orders from all sources follow through the same office and shipping functions.

After an order is received, it is immediately turned over for checking of the customer's credit. If the credit is good, the order will be turned over for pricing and billing; or, in the instances in which the customer prices the merchandise and makes the necessary extensions, these are checked. If the customer's credit is not satisfactory, the order must be held for action by the sales department or some other designated agency. If the order is fully and finally accepted for shipment, it will be priced and extended. In the case of orders where credit is not acceptable, the order is returned to the prospective customer with an explanation of the conditions.

After an order has been checked for credit and priced, it must next be checked as to the availability of the merchandise. In a small organization with few orders for shipment, the deduction for the order to be shipped can be made directly on the inventory control records. In a larger organization with many orders for shipment, it is usually advisable to have a daily tally sheet and a daily deduction made from the stock records. If the organization has very few different items, the inventory control records will be simple. In a large organization with many different items, the inventory control will be a sizeable job.

After the orders have been checked with the stock records and the necessary deductions made there, they are divided into two groups: orders available for shipment and orders held for future shipment. Both groups are passed on to the billing department. In the case of orders with more than one item, of which some are out of stock and some available, the orders are billed in two sections and all available items are shipped.

Since billing of the invoice and actual shipment of the merchandise are the two usual contacts the plant has with all customers, accurate billing is one of the opportunities the plant has to build up customer good-will and confidence. Faulty billing is quick to draw complaints from customers. Checking invoices is a time-consuming job, but must be done to minimize errors, since errors cause needless delays and unnecessary and costly work by the supplier and buyer.

All invoices for merchandise in stock are billed up first and checked. Next the invoices on which merchandise is back-ordered are billed, checked, and filed for future shipment. In this latter case the customer should be notified of the back-order and the contemplated shipping date.

The number of invoices to a billing set will vary from company to company. Usually no less than four copies are used. At this point the shipping copy is turned over to the traffic department for the preparation of the bill of

lading. The remainder of the set is filed in the office until the shipping copy is returned by the shipping department to the office indicating shipment, at which time the bill set is distributed to the customer, sales department, accounts payable, etc.

A very essential step in the preparation of the billing invoice is the sequence in which the items are typed. In the case of companies in which few items are shipped, the sequence is of little importance. A company with many items should have the items billed in numerical order as to stock number or any other sequence that has been used in the plant for the stock layout. If a company has an order-picking area and the items in the order-picking area are arranged in the same sequence as the invoice, the filling of the invoice is immensely simplified. This is a very important step and cannot be over-emphasized. A sound wage incentive system cannot be formulated if the billing sequence is not the same as that used in the order-picking area layout.

When a shipper turns over the custody of a shipment of freight to a rail or highway motor carrier, he receives a receipt which is called a uniform bill of lading. A bill of lading contains on its face a description of the shipment, the names and addresses of the consignor and the consignee, the value of the shipment, and the freight rate which is to be paid. The bill of lading description of the shipment is used by the carrier in making up the way bill and other operating papers used in the handling of the shipment to its

destination. On the back of the bill of lading is a printed detailed statement of the responsibility and liability of the carrier and of the owner of the shipment. This printed statement becomes a contract after the shipper and the carrier have signed the bill of lading. The contract establishes the liability for loss or damage to the shipment while in the hands of the carrier.

The routing of the shipment is suggested either by the customer or the shipper, and is indicated on the bill of lading. The invoice indicates the quantity shipped, and the weight of the shipment is set up from a previously prepared weight schedule. This weight is also indicated on the bill of lading.

The next step in the handling of the order is turning over to the shipping department the copy of the invoice and bill of lading for the actual filling of the order. A system is set up for taking these papers from the office to the order desk in the shipping department. At the desk the supervisor arranges the orders as to type of carrier and sequence of order filling for the order-picking employees. After the order is picked by the order-picker and checked by the checker a system is followed for returning to the office the invoices of the shipped orders, with the signed copies of the bills of lading. This then indicates that the shipment has been turned over to a carrier, and the billing invoice set is distributed to the customer, sales department,

accounts payable, etc.

A seemingly good office routine for handling orders, drawn up in the expectation that it will work in harmonious combination with the shipping operation, may fall short of its promise if efficiency of operation is not constantly sought. Thus, the accuracy with which each step is carried out in the office is a matter of great importance in the shipping department's handling of the order. Since every delay in filling orders there negatively affects the wage incentive system, office accuracy has a direct bearing on the functioning of the shipping department's incentives.

Further, the efficient and constant flow from the office of invoices to the shipping department will determine whether the latter's work is sufficiently steady and well distributed to permit the effective functioning of a wage incentive. If, for example, invoices are sent to the shipping department in an uneven and unpredictable flow, time spent by shipping department personnel on non-productive work at base pay is likely to be out of reasonable proportion and hence defeat the purposes of the wage incentive plan.

INVENTORY CONTROL

Beyond the necessity for a smooth-working office routine for handling orders, there is also the important requirement of a good inventory control system, operated by

the office, before a good wage incentive system can operate satisfactorily in the order filling and shipping department of any organization. In the shipping department out-of-stock conditions, the usual outcome of a poor inventory control system, produce unnecessary discussions between workers and their supervisors and mean lost time in searching the warehouse for possible location of out-of-stock items. When these situations exist, no possible type of wage incentive can be effective.

It will be noted that a low inventory often arises from a condition of insufficient and uncoordinated inventory data with inadequate procedures for control. The result is a loss of business to the organization because in the face of out-of-stock conditions the customer will purchase a competitor's products. Much good will between the customer and the supplier may be lost. Furthermore, an excessive amount of paper work is involved in notifying the customer of delays and in the handling of the customer's delivery complaints.

On the other hand, excessive inventories are almost equally undesirable since they mean interest lost on the money invested in the excess and may cause losses in possible depreciation of the inventory. Unnecessarily large warehouse costs and extra insurance premiums on the excess increase the cost of distribution without facilitating the procedure.

Good inventory control requires a system which assures sufficient quantities of material on hand to operate over a predetermined span of time. It establishes definite dates for re-ordering materials and periodic checks on the inventory control records to ascertain if special re-ordering is necessary before the established re-order date. All material issued and received is recorded, with the balance-on-hand determined daily.

The actual records necessary for good inventory control depend upon the size of the organization and its shipping territory, the bulk-type of the merchandise shipped, the number of different items shipped, the size of the inventory necessary for adequate operation, and the location of the sources of supply.

The three most usual types of inventory control system and their features are:

1 The printed card in a loose-leaf binder. This system is usually used by a plant shipping very few items. Each record card would contain the name of the item, specifications for it, size of the quantity usually ordered, a record of the material as issued or used, and of the material received from the source of supply. Lastly,

the card would contain the balance-on hand figure.

2 The printed card on a rotating drum. This system is used by some large organizations. Each rotating drum will handle up to 6,000 cards. The system of cards and holder is sold by the Wheeldex and Cordineer companies. The information appearing on each card would be similar to that outlined above under (1).

3 The visible index record card system. This system, developed by Kardex, is used by a great many large companies because it has several outstanding features. The component parts of this compact inventory control system are:

a A card for Issues and Receipts,

b A card for Consumption for the Past Years by months,

c A card for Traveling Requisition,

d A Title Insert accommodating on the right-hand side the indexing

information and re-order quantity; and on the left-hand side, the stock supply status divisions,

e The Graph-A-Matic signal device which moves on the stock supply status chart indicating over-stocked, normal, or re-order points and follow-up conditions,

f The Graph-A-Matic Computing Chart, which is a numbered slip printed in varying progressions. The progression selected for a particular item's Issues and Receipts card would depend on the normal inventory desired. This chart is used in conjunction with (d) above, the Title Insert feature.

In order to keep any type of inventory records current, adequate clerical personnel must be available. The people working with these records must be extremely careful so that clerical errors are kept to an absolute minimum. In any inventory system, errors will develop and therefore an actual periodic physical count is necessary. It is the usual practice to take a physical count once or twice a year. As soon as the physical count is available, the

inventory records should be adjusted to the count. If there are small variations between inventory record and physical inventory, checking for discrepancies is not necessary. in the case of large variances, the actual physical inventory and book record should be re-checked. Regardless of the final outcome, the actual inventory count should be used for the future inventory control records.

A SPECIFIC WAGE INCENTIVE PLAN

Up to this point the discussions have centered around the necessary office functions such as preparation of invoices, inventory control, traffic, and the required office and shipping department coordination for the installation of an effective wage incentive system. These steps in the handling of an order are necessary regardless of the size of the industry, number of varying items shipped, case weights, or case sizes.

It must again be stressed that the stock arrangement in the order-picking area (see Figure 3 as an example) must follow the same sequence as that used in the billing of the invoices. A wage incentive system devised for a plant in which the sequences are established will be materially different from one for a plant in which sequences are disregarded.

In order to formulate a method of establishing a wage incentive plan for a shipping operation, it was necessary to

take a specific example. It was decided to use the Boyle-Midway, Inc., Chamblee plant. Since this plant distributes a complete line of household items in small cases, this study would bring out all the problems that might ordinarily be encountered.

The order filling and shipping department will be considered for an individual incentive under the Standard Hour Plan. When the merits of both the group and individual incentives are considered, the individual incentive is a better incentive. In a group bonus the people in the department will be paid an average of the bonus earned by the entire department. In cases where the department is subject to large turnover of personnel, the old and capable employees who put forth their skill and effort receive the same bonus as that received by the new and unskilled workers. It therefore becomes evident that the best motivation can be obtained when an individual incentive is installed.

The plan will cover the two classes of worker: the order-picker and the order-checker. Equitable standards will be determined by means of actual time studies and standard data.

Under the Standard Hour Plan (see Figure 1) the worker will be paid a bonus for all production hours saved over predetermined measured standards. The bonus will be on an accumulative basis for a full shift. The start of each shift will start a new record. Waiting time, break

periods, and all other time not covered by standards will be excluded from the bonus calculation. Bonus earnings will be calculated on the same hourly rate as in the regular base pay.

The wage incentive plan will be formulated with the following regulations in effect:

1 A system will be set up so that shipping orders, with the stencils for case identification, will be delivered to the order desk in the shipping department.

2 The shipping supervisor will divide the orders into two divisions: truck and railroad deliveries. The truck orders will be further broken down as to carrier, and the carrier sequence for loading will be determined. The railroad orders for all destinations will be loaded in a trap car with no regard to sequence.

3 Merchandise arrangement will be in numerical sequence, as shown in Figure 3, with the location of the order desk, the checking area, and the empty wheel-truck area definitely established.

4 The order-picking area will be replenished when necessary by a group of stock handlers.

With the above procedures established, it is next necessary to make time studies on the order-picking and checking operation. The order-picking work is divided into elements, and time studies are made of each of the elements. The following are the elements in the order-picking operation:

Element Number	Description
1	Walk from checking station to empty wheel-truck area.
2	Select empty wheel-truck and move to order desk.
3	Pick up order and stencil, inspect for first stock number and place order on wheel-truck shelf.
4	Move to first item location.
5	Move from behind wheel-truck to stock-picking position.
6	Pick first item (required number of cases).
7	Stencil cases.
8	Move from picking position to position behind truck and check for first number.
9	Move to next item location.
10	Move from behind wheel-truck to stock-picking position.
11	Pick second item (required number of cases).
12	Stencil cases.
13	Move from picking position to position behind truck and check for next stock number.

Element Number	Description

Note: Elements 8 through 13 are repeated until order is completed.

14 Move to checking station.

The above cycle is again followed for the next order.

The following summary will indicate the location of the detailed time study for each element:

Element Number	Derivation of Standard Time	Location of Data
1	Actual time study	Table I
2	Actual time study	Table II
3	Actual time study	Table III
4	Standard data	Figure 4
5	Actual time study	Table IV
6	Actual time study	Table XVIII
7	Actual time study	Figure 8
8	Actual time study	Table X
9	Standard data	Figure 4
10	Actual time study	Table IV
11	Actual time study	Table XVII
12	Actual time study	Figure 8
13	Actual time study	Table X
14	Standard data	Figure 4

The above Tables I, II, III, IV and X are self-explanatory, but a short summary on Figures 4 and 8 and Table XVIII is necessary:

Figure 4. This is a detailed analysis on the standard time for movement between any two stock numbers, from order desk to first stock number, and from last stock number to rail or truck checking station. A method as detailed as this is necessary to establish definitely the time between stock numbers, and this time is figured on shortest distance between the location of the stock numbers. If an average value were taken instead of the exact, the errors that would be introduced would make the wage incentive system either loose or tight. This would produce continual discussions between employees and management.

The vertical and horizontal axis of the chart contains the stock numbers in the order-picking area. The stock numbers on the vertical axis should be used as the starting position, and the stock numbers on the horizontal axis should be the point of destination. The point on the chart where the horizontal and vertical lines intersect is the standard time for the move between the two stock numbers.

In order that this chart may be easily read by the time clerk, the chart should be mounted on a drum, the drum covered by a box with a curved top. A slide on the top of the box over the visible section of the chart will facilitate the reading of the standard time.

Figure 8. The time study information from Table XI was plotted on graph paper, and a straight line was drawn through the points. It is evident that the slope of the line indicates the time required to stencil one case, while the horizontal intercept gives the time required to get ready and complete the stenciling cycle.

Table XVIII. The time for picking a number of cases of merchandise and placing them on a wheel-truck will vary with the weight of the case if all other factors remain constant. In order to establish a relationship among cases with varying weights, time studies were made of five different weight cases. The studies are shown on Tables V through IX. A relationship between time per piece and time per pound was desired. Various percentage relationships were tried on the five studies, and the 19 percent of the time per piece plus 81 percent of the time per pound resulted in the most uniform constant. This ratio of pieces to pounds simplifies the process of obtaining standard time per order for cases with varying weights.

The time data of elements 1 through 14, comprising the complete order-picking sequence, were arranged in a standardized form as shown on Figure 4. The form included the provision for calculation of the percentage production. With the percent production, the percent bonus can be determined from the curve in Figure 1 for the Standard Hour Plan.

The checking operation was next divided into its elements and time studies were made of each element. The following are the elements in the checking operation:

Element Number	Description
1	Reach for order and stencil.
2	Check stencil against billing as to name and address.
3	Dispose of stencil.
4	Read stock number and case quantity on order.
5	Check quantity of cases and stock number picked.
6	Sign shipping invoice.
7	Move wheel-truck 30 feet.

At this point the shipment is turned over to the carrier.

The following summary will indicate the location of the detailed time study for each element:

Element Number	Derivation of Standard Time	Location of Data
1	Actual time study	Table XII
2	Actual time study	Table XIV
3	Actual time study	Table XV
4	Actual time study	Table XIII
5	Actual time study	Figure 7
6	Actual time study	Table XVII
7	Actual time study	Table XIX

The above Tables XII, XIII, XIV, XV, XVII, and XIX are self-explanatory, but an explanation of Figure 7 is necessary:

Figure 7. The time study information from Table XVI was plotted on graph paper and a straight line was drawn through the points. It can be seen that the slope of the line indicates the time required to check one case, while the horizontal intercept gives the time required to get ready and complete the checking cycle.

The time data of elements 1 through 6, covering the complete checking sequence, were arranged in a standardized form, as shown in Figure 5. The form makes provision for the calculation of percentage production. With the percentage production the percent bonus can be determined from the curve in Figure 1 for the Standard Hour Plan.

THE WAGE INCENTIVE SYSTEM SET IN OPERATION

After all the standard time data for the wage incentive system are completed, a definite date must be decided upon for its installation. Before the plan is placed in effect, all employees under the incentive should be advised of the details. The education of the employees is in addition to the employee representation on the standards committee. In the case of a union shop, the union usually has a representative on the committee installing the incentive. In a non-union situation, the shop committee usually has a man in the industrial engineering department all through the formulation stage.

As soon as the incentive is installed, the employee's earnings must be figured daily. The personnel designated to calculate the wages is usually trained by the industrial engineer in charge of the incentive and by the plant accountant. The plant accountant will be responsible for the accuracy of the earnings figures. The incentive computations will fall under the same system of auditing as the remainder of the plant accounting records. In addition to the clerical work necessary to determine each employee's percent production for each day, as shown in Figures 5 and 6, the weekly calculation must be made of the employee's earnings, as shown under Appendix I, Sample Calculations.

CONCLUSIONS

In this discussion on wage incentives with office and shipping department coordination, I have tried to lay out a general pattern of what would be considered in the preparation of a wage incentive plan for a shipping department. A wage incentive can be used effectively to remunerate the deserving employees and control the over-all costs of an organization.

The daily and weekly earnings of all employees placed on incentive must be watched closely so that the standards do not become "too tight" or "too loose". If standards are set or become "too tight" or "too loose", difficulties will arise. Standards which seem to be "too tight" are likely to

result in discouraged efforts and the decision to hold back productivity until adjustments are made. Standards which appear to be on the "tight" side at least have the advantage of being bound to come to the surface where they can be investigated and either explained or rectified.

Standards which were originally a representation of a fair day's work become "loose" through changes in method or materials, but they often are not changed to fit the new conditions. In these cases where, for one reason or another, standards become "too loose", if workers apply themselves and earn much more than was originally anticipated, jealousies are likely to occur which tend toward an easing up on the part of the worker.

It is readily evident that the installation of a plan is not the end of the work: A wage incentive system needs continual inspection and thought to keep standards from getting out of control.

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APPENDIX I

SAMPLE CALCULATIONS

APPENDIX I

Sample Calculation

Determination of order-picker's earnings if the percent production is 30 in 35 actual hours worked on incentive and 10 hours additional on non-incentive.

The following procedure conforms with the provisions of the Federal Wage and Hour Act and the Walsh-Healy Bill.

The percent production of 30 under the Standard Hour Plan, as shown in Figure 1, would give the employee 30% bonus.

The calculation of overtime premium and total week's earnings are:

Total actual hours worked in week (on incentive)	35	
Bonus earned on incentive hours	30%	
Total actual hours worked on day rate	10	
Total hours worked, incentive and non-incentive	45	
Overtime hours worked	5	
With hourly rate of $1,		
Earnings for hours on incentive $1 (35)		$35
Earnings for bonus on incentive $35 (30%)		$10.50
Earnings for hours on non-incentive $1 (10)		$10
Total earnings, not including premium		$55.50

Rate upon which overtime premium is paid:

$55.50 ÷ 45 = $1.233 per hour

Overtime premium:

$5 \times \frac{1}{2} \times \$1.233 = \$3.08$

Total Week's Pay:

$55.50 + $3.08 = $58.08

APPENDIX II

TABLES

TABLE I TIME STUDY READINGS

Element: Walk from checking station to empty wheel truck area.

Operator's Name: Jackson.

Average Distance: 25 feet.

Time	Time	Time
0.09	0.10	0.09
0.09	0.12	0.10
0.10	0.11	0.11
0.08	0.10	0.13
0.11	0.09	0.11
0.10	0.09	0.10
0.09	0.10	0.09
0.12	0.12	0.09
0.09	0.14	0.12
0.10	0.12	0.10
Total 0.97	1.09	1.04

Total time:	3.10
Observation:	30
Average time:	0.103
Minimum time:	0.08
Rating:	105
Normal time:	0.108
Allowances:	15%
Standard time:	0.124

TABLE II TIME STUDY READINGS

Element: Select empty wheel truck and move to order desk.

Operator's Name: Lyle.

Average Distance: 25 feet.

Time	Time	Time
0.11	0.12	0.13
0.12	0.11	0.11
0.12	0.12	0.12
0.13	0.10	0.10
0.12	0.13	0.10
0.11	0.12	0.12
0.12	0.12	0.11
0.13	0.11	0.11
0.14	0.12	0.12
0.12	0.10	0.11
Total 1.22	1.15	1.13

Total time:	3.50
Observation:	30
Average time:	0.117
Minimum time:	0.10
Rating:	110
Normal time:	0.128
Allowances:	15%
Standard time:	0.147

TABLE III TIME STUDY READINGS

Element: Pick up order and stencil, inspect for first stock number and place order on wheel truck shelf.

Operator's Name: Jackson.

Time	Time	Time
0.09	0.10	0.09
0.08	0.11	0.09
0.08	0.10	0.12
0.10	0.09	0.11
0.09	0.08	0.09
0.10	0.09	0.11
0.11	0.10	0.10
0.09	0.11	0.12
0.08	0.10	0.11
0.09	0.10	0.12
Total 0.91	0.98	1.06

Total time:	2.95
Observation:	30
Average time:	0.098
Minimum time:	0.08
Rating:	100
Normal time:	0.098
Allowances:	15%
Standard time:	0.113

TABLE IV TIME STUDY READINGS

Element: Move from behind wheel truck to stock picking position.

Operator's Name: Lyle.

Time	Time	Time
0.02	0.03	0.02
0.02	0.02	0.02
0.03	0.02	0.03
0.02	0.03	0.02
0.02	0.03	0.03
0.03	0.03	0.03
0.03	0.02	0.02
0.02	0.02	0.02
0.02	0.02	0.02
0.03	0.03	0.03
Total 0.24	0.25	0.24

Total time:	0.73
Observation:	30
Average time:	0.025
Minimum time:	0.02
Rating:	110
Normal time:	0.027
Allowances:	15%
Standard time:	0.031

TABLE V TIME STUDY READINGS

Element: Reach for case on pallet, pick up case, move case to wheel truck, and place case on wheel truck.

Stock Layout: See Sketch I.

Operator's Name: Lyle.

Weight of Case: 9.28 lb.

Stock Number: 5012.

Number of Cases per Layer: 30.

Number of Layers per Pallet: 8.

Eighth Layer		Fourth Layer		Fifth Layer	
Time	Readings	Time	Readings	Time	Readings
.05	.05	.05	.05	.06	.06
.06	.11	.04	.09	.06	.12
.07	.18	.05	.14	.08	.20
.07	.25	.05	.19	.05	.25
.06	.31	.05	.24	.05	.30
.05	.36	.04	.28	.05	.35
.05	.41	.04	.32	.04	.39
.06	.47	.04	.36	.04	.43
.06	.53	.04	.40	.04	.47
.05	.58	.04	.44	.04	.51
.05	.63	.05	.49	.03	.54
.05	.68	.04	.53	.05	.59
.05	.73	.05	.58	.05	.64
.06	.79	.05	.63	.05	.69
.06	.85	.05	.68	.06	.75
.05	.90	.04	.72	.05	.80
.05	.95	.05	.77	.06	.86
.07	1.02	.06	.83	.07	.93
.06	1.08	.06	.89	.07	1.00
.05	1.13	.05	.94	.05	1.05
.08	1.21	.06	1.00	.04	1.09
.07	1.28	.05	1.05	.06	1.15
.05	1.33	.05	1.10	.04	1.19
.05	1.38	.06	1.16	.03	1.22
.06	1.44	.05	1.21	.05	1.27
.06	1.50	.05	1.26	.05	1.32
.05	1.55	.06	1.32	.05	1.37
.05	1.60	.06	1.38	.05	1.42
.05	1.65	.07	1.45	.06	1.48
.05	1.70	.06	1.51	.04	1.52

TABLE V (Continued) TIME STUDY READINGS

First Layer	
Time	Readings
.04	.04
.06	.10
.05	.15
.06	.21
.05	.26
.04	.30
.05	.35
.06	.41
.06	.47
.05	.52
.05	.57
.04	.61
.05	.66
.04	.70
.04	.74
.05	.79
.04	.83
.04	.87
.05	.92
.05	.97
.05	1.02
.07	1.09
.07	1.16
.06	1.22
.05	1.27
.05	1.32
.06	1.38
.07	1.45
.05	1.50
.06	1.56

	1st	4th	5th	8th	
Total time:	1.56	1.51	1.52	1.70	
Observation:	30	30	30	30	
Average time:	0.052	0.050	0.051	0.057	
Minimum time:	.04	.04	.03	.05	
Rating:	140	140	140	130	
Normal time:	0.073	0.070	0.071	0.074	
Average Normal time:					0.072
Allowances:					15%
Standard time:					0.083

TABLE VI TIME STUDY READINGS

Element: Reach for case on pallet, pick up case, move case to wheel truck, and place case on wheel truck.

Stock Layout: See Sketch I.

Operator's Name: Lyle.

Weight of Case: 18.6 lb.

Stock Number: 8719.

Number of Cases per Layer: 11.

Number of Layers per Pallet: 5.

Fifth Layer		Fourth Layer		Third Layer		First Layer	
Time	Reading	Time	Reading	Time	Reading	Time	Reading
.05	.05	.04	.04	.03	.03	.03	.03
.05	.10	.04	.08	.04	.07	.03	.06
.05	.15	.04	.12	.04	.11	.04	.10
.05	.20	.05	.17	.07	.18	.04	.14
.05	.25	.04	.21	.06	.24	.05	.19
.06	.31	.06	.27	.06	.30	.05	.24
.04	.35	.06	.33	.05	.35	.05	.29
.05	.40	.05	.38	.07	.42	.05	.34
.06	.46	.06	.44	.07	.49	.06	.40
.06	.52	.06	.50	.07	.56	.07	.47
.04	.56	.06	.56	.07	.63	.07	.54

	5th	4th	3rd	1st	Average
Total time:	.56	.56	.63	.54	
Observation:	11	11	11	11	
Average time:	0.051	0.051	0.057	0.049	
Minimum time:	0.04	0.04	0.04	0.03	
Rating:	150	150	140	150	
Normal time:	0.076	0.076	0.080	0.074	
Average Normal time:					0.077
Allowances:					15%
Standard time:					0.089

TABLE VII TIME STUDY READINGS

Element:	Reach for case on pallet, pick up case, move case to wheel truck, and place case on wheel truck.
Stock Layout:	See Sketch I.
Operator's Name:	Davenport.
Weight of Case:	28.6 lb.
Stock Number:	7191.
Number of Cases per Layer:	16.
Number of Layers per Pallet:	4.

Fourth Layer		Second Layer		First Layer	
Time	Reading	Time	Reading	Time	Reading
.04	.04	.04	.04	.05	.05
.04	.08	.03	.07	.05	.10
.07	.15	.05	.12	.05	.15
.06	.21	.05	.17	.04	.19
.07	.28	.06	.23	.04	.23
.05	.33	.09	.32	.07	.30
.06	.39	.06	.38	.05	.35
.07	.46	.05	.43	.05	.40
.06	.52	.06	.49	.04	.44
.07	.59	.06	.55	.08	.52
.05	.64	.05	.60	.06	.58
.09	.73	.06	.66	.05	.63
.06	.79	.07	.73	.07	.70
.07	.86	.07	.80	.05	.75
.07	.93	.09	.89	.06	.81
.07	1.00	.09	.98	.08	.89

	4th	2nd	1st	Average
Total time:	1.00	0.98	0.89	
Observation:	16	16	16	
Average time:	0.63	0.61	0.56	
Minimum time:	0.04	0.03	0.04	
Rating:	125	125	145	
Normal time:	0.078	0.077	0.081	
Average Normal time:				0.079
Allowances:				15%
Standard time:				0.091

TABLE VIII TIME STUDY READINGS

Element:	Reach for case on pallet, pick up case, move case to wheel truck, and place case on wheel truck.
Stock Layout:	See Sketch I.
Operator's Name:	Dove.
Weight of Case:	40.6 lb.
Stock Number:	391.
Number of Cases per Layer:	11.
Number of Layers per Pallet:	4.

Fourth Layer		Third Layer		Second Layer		First Layer	
Time	Reading	Time	Reading	Time	Reading	Time	Reading
.08	.08	.06	.06	.08	.08	.08	.08
.08	.16	.08	.14	.08	.16	.09	.17
.07	.23	.09	.23	.08	.24	.09	.26
.08	.31	.08	.31	.08	.32	.09	.35
.09	.40	.09	.40	.08	.40	.08	.43
.10	.50	.08	.48	.09	.49	.08	.51
.08	.58	.09	.57	.09	.58	.10	.61
.08	.66	.10	.67	.08	.66	.08	.69
.09	.75	.09	.76	.08	.74	.11	.80
.09	.84	.09	.85	.08	.82	.08	.88
.09	.93	.08	.93	.08	.90	.10	.98

	4th	3rd	2nd	1st	Average
Total time:	.93	.93	.90	.98	
Observations:	11	11	11	11	
Average time:	0.084	0.084	0.082	0.089	
Minimum time:	.07	.06	.07	.08	
Rating	110	110	115	100	
Normal time:	0.093	0.093	0.094	0.089	
Average Normal time:					0.092
Allowances:					15%
Standard time:					0.106

TABLE IX TIME STUDY READINGS

Element: Reach for case on pallet, pick up case, move case to wheel truck, and place case on wheel truck.

Stock Layout: See Sketch I.

Operator's Name: Davenport.

Weight of Case: 54.0 lb.

Stock Number: 988.

Number of Cases per Layer: 9.

Number of Layers per Pallet: 4.

Fourth Layer		Third Layer		Second Layer		First Layer	
Time	Reading	Time	Reading	Time	Reading	Time	Reading
.07	.07	.07	.07	.07	.07	.08	.08
.08	.15	.08	.15	.07	.14	.07	.15
.08	.23	.08	.23	.08	.22	.08	.23
.08	.31	.09	.32	.10	.32	.09	.32
.07	.38	.11	.43	.09	.41	.09	.41
.12	.50	.11	.54	.08	.49	.08	.49
.10	.60	.10	.64	.10	.59	.10	.59
.09	.69	.11	.75	.09	.68	.09	.68
.11	.80	.10	.85	.08	.76	.08	.76

	4th	3rd	2nd	1st	Average
Total time:	.80	.85	.76	.76	
Observation:	9	9	9	9	
Average time:	0.089	0.094	0.085	0.085	
Minimum time:	0.07	0.07	0.07	0.07	
Rating:	110	100	115	115	
Normal time:	0.098	0.094	0.097	0.097	
Average Normal time:					0.097
Allowances					15%
Standard time:					0.112

TABLE X TIME STUDY READINGS

Element: Move from picking position to position behind truck and check for next stock number.

Operator's Name: Dove.

Time	Time	Time
0.03	0.04	0.03
0.04	0.04	0.04
0.04	0.05	0.04
0.04	0.04	0.05
0.03	0.04	0.04
0.05	0.05	0.04
0.04	0.04	0.05
0.03	0.04	0.04
0.04	0.05	0.03
0.05	0.04	0.04
Total 0.39	0.43	0.40

Total time:	1.22
Observation:	30
Average Time:	0.041
Minimum time:	0.03
Rating:	110
Normal time:	0.045
Allowances:	15%
Standard time:	0.052

TABLE XI TIME STUDY READINGS

Element: Stenciling Cases.

Operator's Name: Dove.

One Case Time	Two Cases Time	Three Cases Time	Four Cases Time
.05	.07	.07	.08
.04	.06	.07	.08
.06	.06	.08	.09
.05	.07	.07	.08
.05	.07	.07	.09
.06	.06	.08	.08
.06	.07	.06	.09
.05	.06	.07	.09
.05	.07	.07	.08
.06	.07	.08	.08
0.53	0.66	0.72	0.84

Five Cases Time	Ten Cases Time	Fifteen Cases Time
.09	.16	.20
.10	.15	.20
.11	.17	.19
.10	.16	.18
.10	.18	.20
.09	.15	.17
.11	.18	.18
.10	.16	.20
.10	.15	.19
.11	.17	.21
Total 1.01	1.63	1.92

	1 Case	2 Cases	3 Cases	4 Cases
Total time:	0.53	0.66	0.72	0.84
Observation:	10	10	10	10
Average time:	0.053	0.066	0.072	0.084
Minimum time:	0.04	0.06	0.06	0.08
Rating:	110	110	110	110
Normal time:	0.058	0.073	0.079	0.092
Allowances:	15%	15%	15%	15%
Standard time:	0.067	0.084	0.091	0.106

TABLE XI (Continued) TIME STUDY READINGS

	5 Cases	10 Cases	15 Cases
Total time:	1.01	1.63	1.92
Observation:	10	10	10
Average time:	0.101	0.163	0.192
Minimum time:	0.09	0.15	0.17
Rating:	110	110	115
Normal time:	0.111	0.206	0.220
Allowances:	15%	15%	15%
Standard time:	0.128	0.206	0.253

TABLE XII TIME STUDY READINGS

Element: Reach for Order and Stencil.

Operator's Name: Foster.

Time	Time	Time
0.08	0.09	0.08
0.09	0.10	0.08
0.07	0.07	0.08
0.08	0.08	0.10
0.06	0.08	0.09
0.09	0.09	0.07
0.08	0.10	0.08
0.06	0.10	0.05
0.09	0.08	0.10
0.11	0.07	0.10
Total 0.81	0.86	0.83

Total time:	2.50
Observation:	30
Average time:	0.083
Minimum time:	0.06
Rating:	120
Normal time:	0.100
Allowance:	20%
Standard time:	0.120

TABLE XIII TIME STUDY READINGS

Element: Read Stock Number and Case Quantity.

Operator's Name: Foster.

Time	Time	Time
0.05	0.05	0.06
0.06	0.06	0.05
0.05	0.05	0.05
0.06	0.05	0.06
0.06	0.06	0.06
0.04	0.06	0.06
0.05	0.06	0.06
0.06	0.05	0.05
0.05	0.05	0.05
0.05	0.06	0.06
Total 0.53	0.55	0.56

Total time:	1.64
Observation:	30
Average time:	0.055
Minimum time:	0.04
Rating:	115
Normal time:	0.063
Allowances:	20%
Standard time:	0.076

TABLE XIV TIME STUDY READINGS

Element: Check Stencil against Billing as to Name and Address.

Operator's Name: Brand.

Time	Time	Time
0.12	0.13	0.12
0.13	0.12	0.13
0.11	0.12	0.12
0.08	0.12	0.12
0.12	0.14	0.14
0.13	0.11	0.10
0.14	0.09	0.12
0.12	0.10	0.08
0.10	0.12	0.10
0.10	0.14	0.14
Total 1.15	1.19	1.17

Total time:	3.51
Observation:	30
Average time:	0.117
Minimum time:	0.08
Rating:	110
Normal time:	0.129
Allowances:	15%
Standard time:	0.148

TABLE XV TIME STUDY READINGS

Element: Dispose of Stencil.

Operator's Name: Jackson.

Time	Time	Time
0.03	0.05	0.04
0.04	0.04	0.04
0.04	0.03	0.04
0.03	0.04	0.03
0.05	0.05	0.04
0.04	0.05	0.03
0.04	0.04	0.04
0.03	0.05	0.05
0.04	0.05	0.05
0.05	0.05	0.04
Total 0.39	0.45	0.40

Total time:	1.24
Ovservation:	30
Average time:	0.041
Minimum time:	0.03
Rating:	100
Normal time:	0.041
Allowances:	15%
Standard time:	0.047

TABLE XVI TIME STUDY READINGS

Element: Check Quantity of Cases and Stock Number picked.

Operator's Name: Jackson.

Time for One Case	Time for Five Cases	Time for Ten Cases	Time for Twenty Cases
0.05	0.08	0.12	0.22
0.06	0.09	0.14	0.25
0.06	0.09	0.11	0.24
0.07	0.08	0.13	0.24
0.05	0.10	0.12	0.23
0.06	0.09	0.12	0.25
0.05	0.09	0.14	0.22
0.06	0.10	0.12	0.24
0.06	0.08	0.15	0.25
0.07	0.09	0.11	0.22
0.08	0.09	0.13	0.24
0.06	0.10	0.12	0.20
0.07	0.11	0.12	0.21
0.06	0.10	0.14	0.23
0.06	0.09	0.12	0.22
Total 0.92	1.38	1.89	3.46

	One Case	Five Cases	Ten Cases	Twenty Cases
Total time:	0.92	1.38	1.89	3.46
Observation:	15	15	15	15
Average time:	0.061	0.092	0.126	0.231
Minimum time:	0.05	0.08	0.11	0.20
Rating:	105	105	105	105
Normal time:	0.064	0.097	0.132	0.242
Allowances:	15%	15%	15%	15%
Standard time:	0.074	0.112	0.152	0.278

TABLE XVII TIME STUDY READINGS

Element: Sign Shipping Invoice.

Operator's Name: Foster.

Time	Time	Time
0.09	0.10	0.09
0.10	0.09	0.09
0.09	0.09	0.10
0.08	0.09	0.10
0.10	0.07	0.09
0.09	0.08	0.08
0.09	0.09	0.09
0.08	0.09	0.10
0.09	0.10	0.11
0.10	0.10	0.09
Total 0.91	0.90	0.94

Total time:	2.75
Observation:	30
Average time:	0.092
Minimum time:	0.07
Rating:	110
Normal time:	0.102
Allowances:	15%
Standard time:	0.117

TABLE XVIII RATIO BETWEEN TIME PER PIECE AND TIME PER POUND

Weight per Piece	Standard Time per Piece	Time per lb.
9.3	0.083	0.0089
18.3	0.089	0.0048
28.6	0.091	0.0032
40.6	0.106	0.0026
54.0	0.112	0.0021
Total	0.481	0.0216
Average	0.096	0.0043

Ratio between time/piece and time/pound

20%-80%	10%-90%	30%-70%	18%-82%	16%-84%	19%-81%
0.0237	0.0173	0.0311	0.0223	0.0208	0.0230
0.0216	0.0132	0.0301	0.0200	0.0183	0.0208
0.0208	0.0120	0.0296	0.0190	0.0173	0.0199
0.0233	0.0129	0.0336	0.0212	0.0192	0.0223
0.0241	0.0131	0.0351	0.0221	0.0198	0.0230

Standard time = 19%(Average time per piece) plus
81%(Average time per lb.)

TABLE XIX TIME STUDY READINGS

Element: Move Wheel Truck 30 feet into Truck or Railroad Car.

Operator's Name: Brand.

	Time	Time
	0.16	0.15
	0.14	0.18
	0.18	0.16
	0.20	0.20
	0.18	0.18
	0.19	0.17
	0.16	0.19
	0.18	0.18
	0.20	0.16
	0.15	0.15
Total	1.74	1.72

Total time:	3.46
Observation:	20
Average time:	0.173
Minimum time:	0.14
Rating:	100
Normal time:	0.173
Allowances:	15%
Standard time:	0.199

APPENDIX III

FIGURES

NAME — _____

DATE —. _____

CHECKER

SHEET ____ OF ____

ORDER NUMBER	PREPARATION AND MOVING TIME	READING AND CHECKING TIME PER ITEM 0.126 (No ITEMS/ORDER	CHECKING TIME PER CASE .009 (No CASES PER ORDER	SUB-TOTAL ALLOWED TIME
	0.504	0.126 ( ) =	.009 ( ) =	

NAME —
DATE —

ORDER PICKER

ITEMS FOR ORDER PICKING	ORDERS PICKED																									
PREPARATION TIME PER ORDER		TIME 0.384		TIME 0.384		TIME 0.384		TIME 0.384		TIME 0.384		TIME 0.384		TIME 0.384		TIME 0.384		TIME 0.384		TIME 0.384		TIME 0.384		TIME 0.384		
MOVING TIME STOCK NO. / ORDER DESK TO	ORDER DESK		ORDER DESK		ORDER DESK		ORDER DESK		ORDER DESK		ORDER DESK		ORDER DESK		ORDER DESK		ORDER DESK		ORDER DESK		ORDER DESK		ORDER DESK		ORDER DESK
POSITIONING TIME - 0.083 x (No. OF ITEMS)	.083( )		.083( )		.083( )		.083( )		.083( )		.083( )		.083( )		.083( )		.083( )		.083( )		.083( )		.083( )		.083( )	
STENCILING TIME		0.05		0.05		0.05		0.05		0.05		0.05		0.05		0.05		0.05		0.05		0.05		0.05		0.05
0.007 x No. OF CASES	.007( )		.007( )		.007( )		.007( )		.007( )		.007( )		.007( )		.007( )		.007( )		.007( )		.007( )		.007( )		.007( )	
PICKING CASES ON ORDER																										
0.018 (No. OF CASES)	.018( )		.018( )		.018( )		.018( )		.018( )		.018( )		.018( )		.018( )		.018( )		.018( )		.018( )		.018( )		.018( )	
0.0035 (No. OF POUNDS)	.0035( )		.0035( )		.0035( )		.0035( )		.0035( )		.0035( )		.0035( )		.0035( )		.0035( )		.0035( )		.0035( )		.0035( )		.0035( )	
SUB-TOTAL ALLOWED TIME																										

NOTE:
SEE PAGE 23 FOR EXPLANATION

FIGURE 5 STANDARD TIME SUMMARY SHEET FOR ORDER PICKER

ORDER PICKER

SHEET ____ OF ____

TIME		TIME		TIME		TIME		TIME		TIME		TIME		TIME		TIME		TIME		TIME		TIME		TIME
.384		0.384		0.384		0.384		0.384		0.384		0.384		0.384		0.384		0384		0.384		0.384		0.384
	ORDER DESK		ORDER DESK		ORDER DESK		ORDER DESK		ORDER DESK		ORDER DESK		ORDER DESK		ORDER DESK		ORDER DESK		ORDER DESK		ORDER DESK		ORDER DESK	
	.083( )		.083( )		.083( )		.083( )		.083( )		.083( )		.083( )		.083( )		.083( )		.083( )		.083( )		.083( )	
.05		0.05		0.05		0.05		0.05		0.05		0.05		0.05		0.05		0.05		0.05		0.05		0.05
	.007( )		.007( )		.007( )		.007( )		.007( )		.007( )		.007( )		.007( )		.007( )		.007( )		.007( )		.007( )	
	.018( )		.018( )		.018( )		.018( )		.018( )		.018( )		.018( )		.018( )		.018( )		.018( )		.018( )		.018( )	
	.0035( )		.0035( )		.0035( )		.0035( )		.0035( )		.0035( )		.0035( )		.0035( )		.0035( )		.0035( )		.0035( )		.0035( )	

TOTAL ALLOWED HOURS ____

TOTAL ACTUAL HOURS ____

% PRODUCTION ____

PICKER

STOCK NUMBERS

STOCK NUMBERS

ORDER DESK

200 238 390 391 403 407 413 423 424 430 435 448 450 451 590 645 646 814 844 854 860 874 878 879 899 936 940 988 1406 1816 1832 1836 1839 1840 1950 1951 2011 5001 5003 5004 5012 5013 5050 5051 5052 5053 5054 5055 5060 5225 7109 7113 7119 7191 7195 7225 8002 8004 8043 8046 8326 8390 8393 8501 8511 8521 8719 8720 8776 8871 8874 8877 8878 8879 8887 8888 8890 8891 8901 8902 8959 9501 9519 9520 9521 9522 9601 9602 9606

FIGURE 4 STANDARD TIME FOR TRAVEL BETWEEN STOCK NUMBERS

NOTE: SEE PAGE 23 FOR EXPLANATION

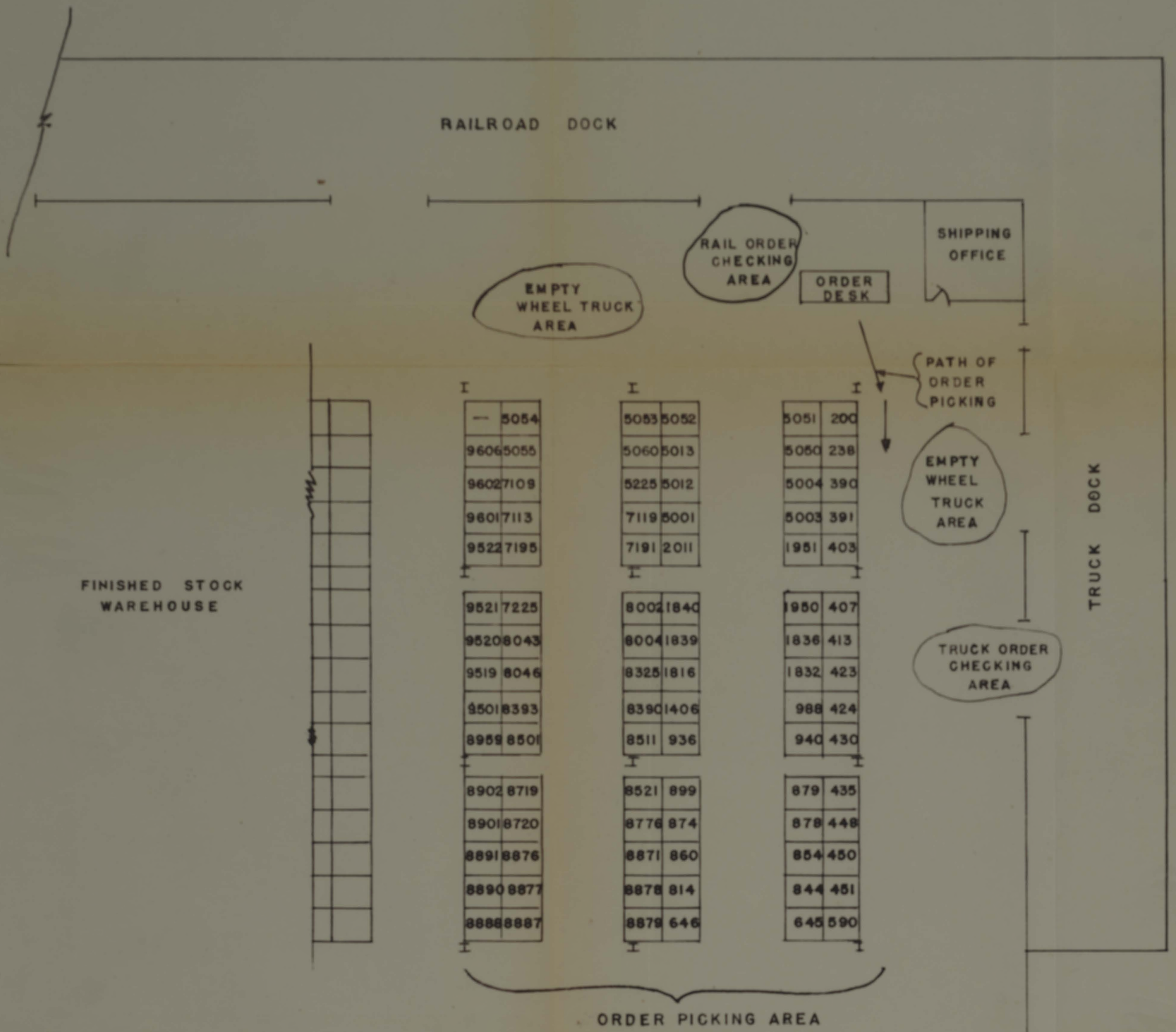

FIGURE 3 LAYOUT OF ORDER PICKING AREA

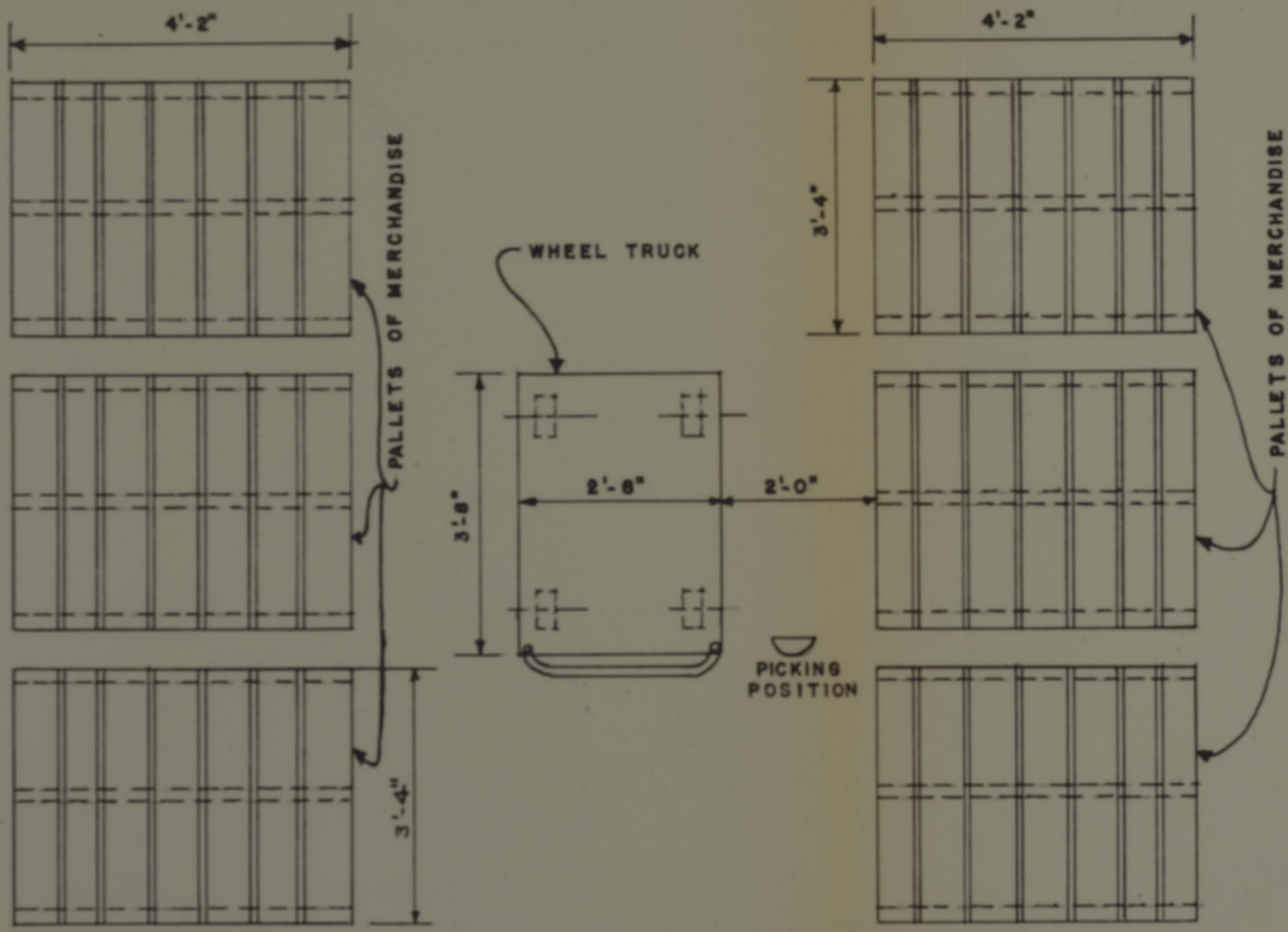

FIGURE 2 LAYOUT ON POSITIONING OF PALLETS AND WHEEL TRUCK

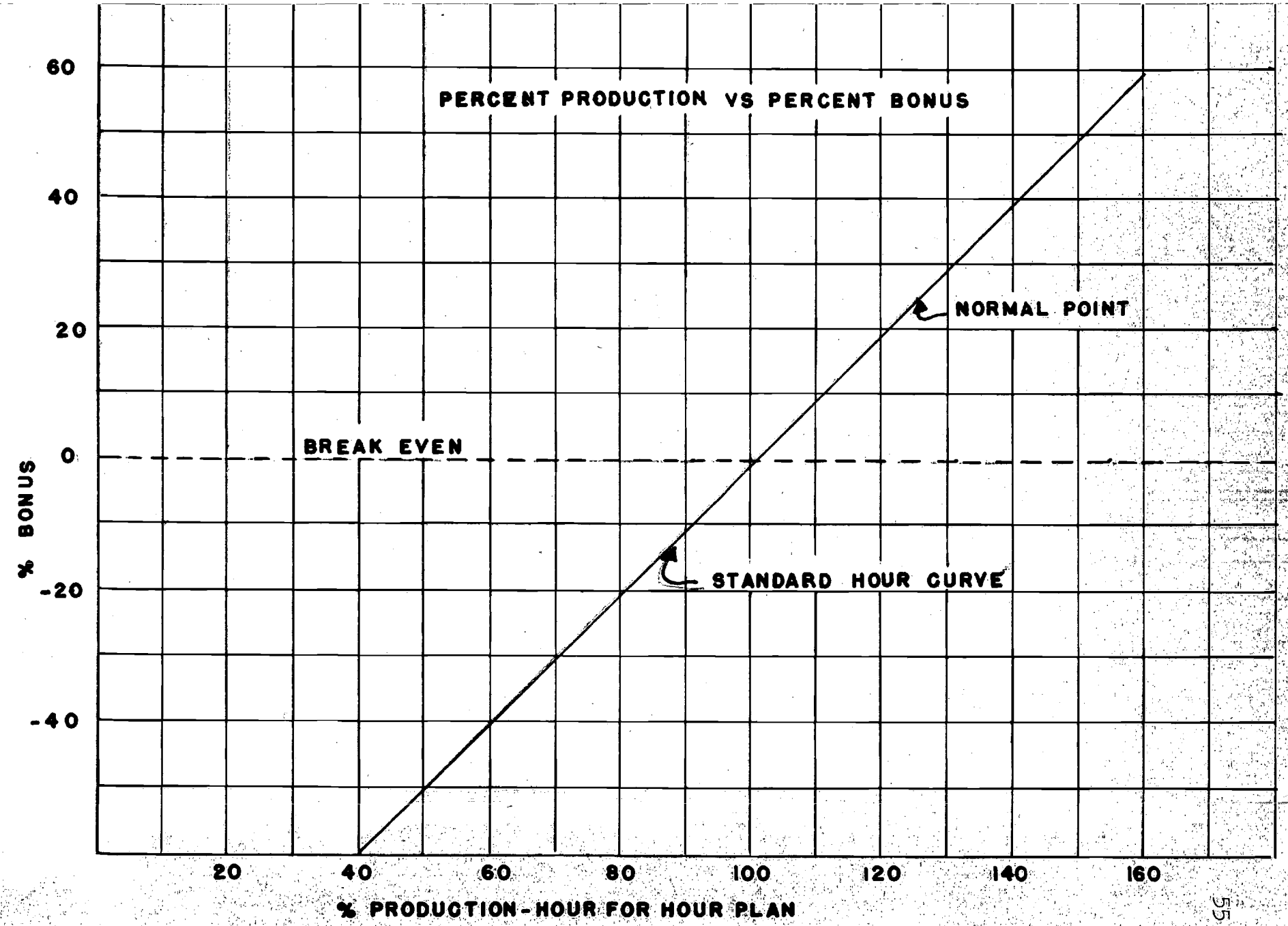

FIGURE I STANDARD HOUR PLAN

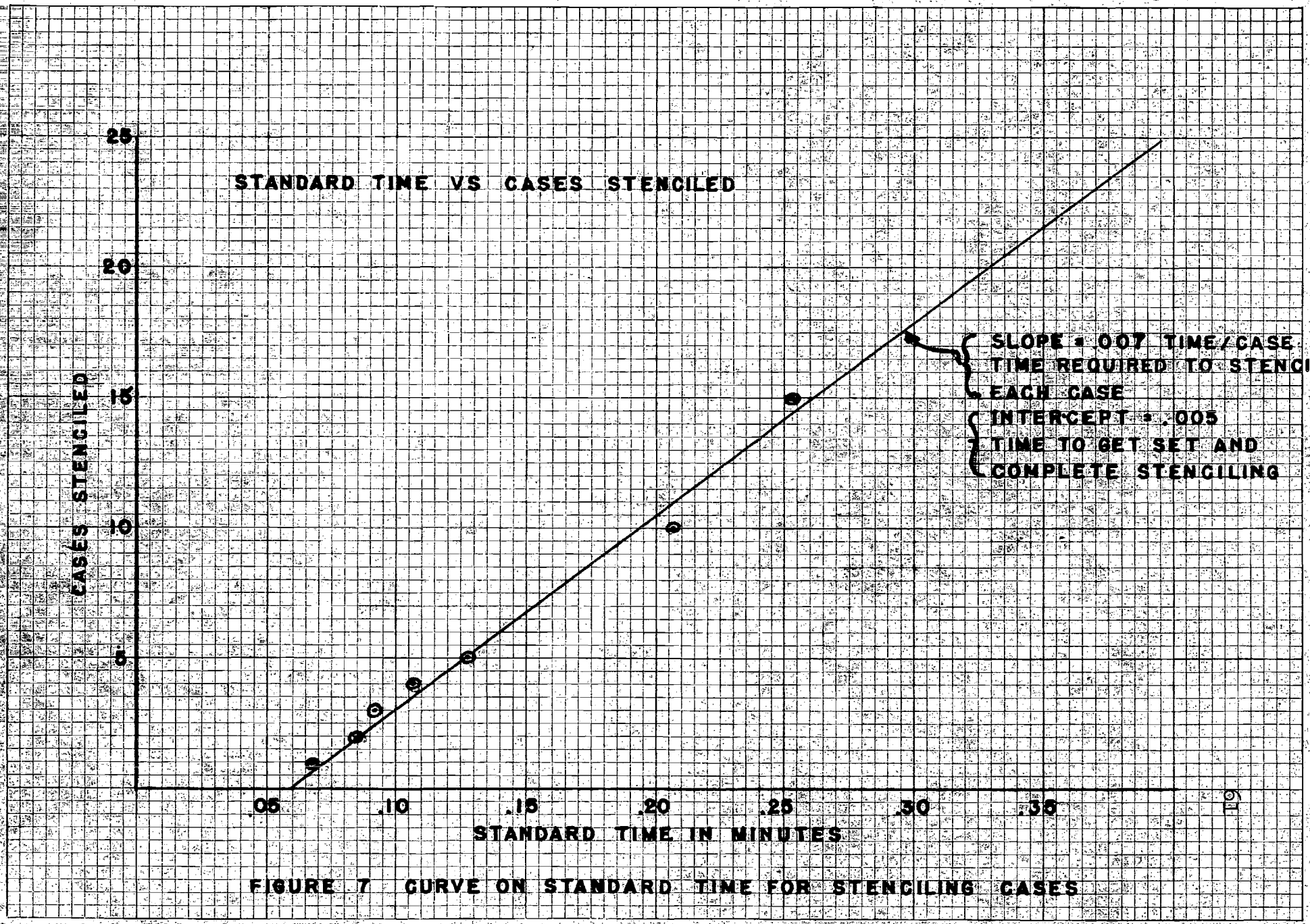

FIGURE 7 CURVE ON STANDARD TIME FOR STENCILING CASES

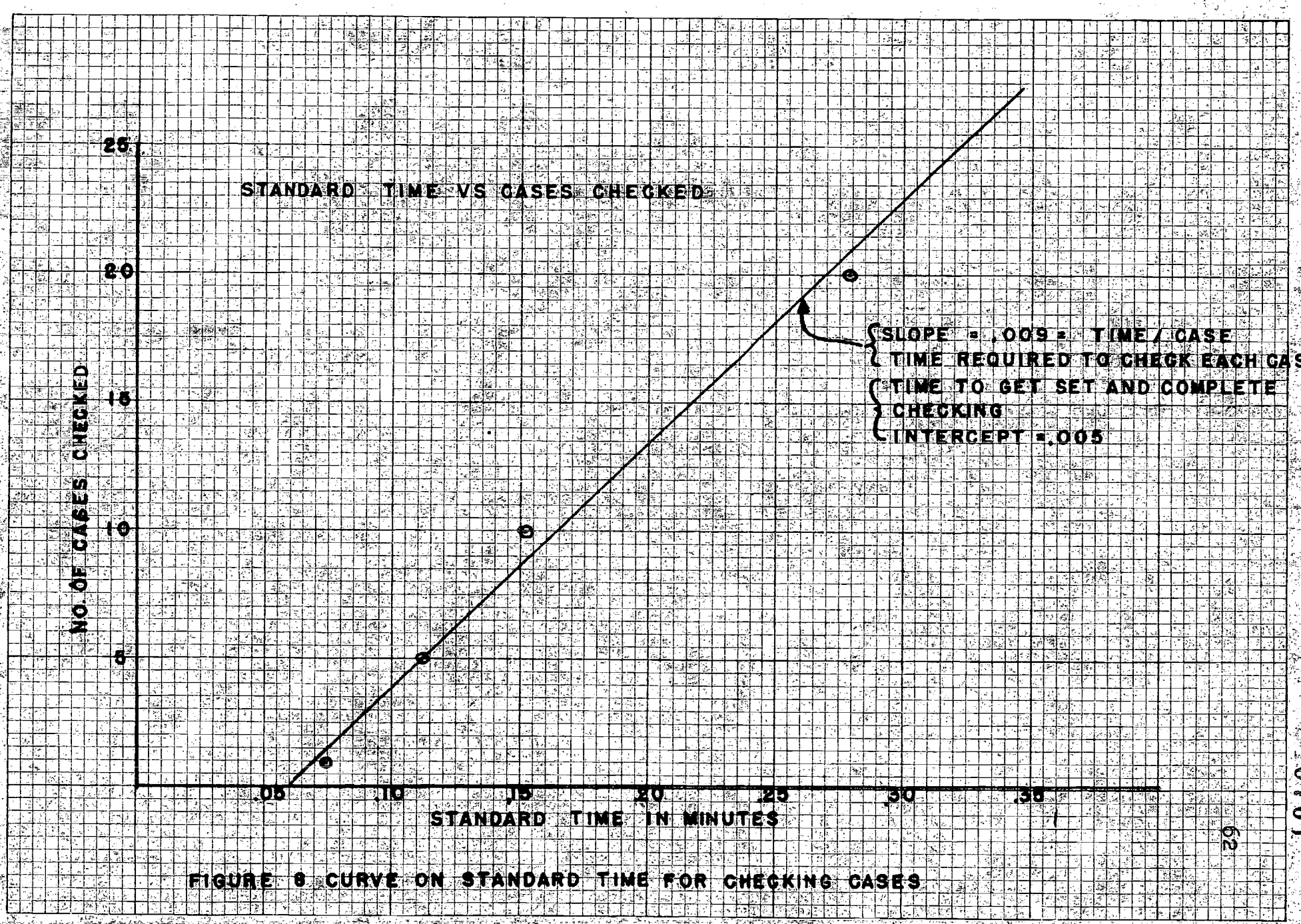

FIGURE 8 CURVE ON STANDARD TIME FOR CHECKING CASES